



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,159	12/06/2006	Veronique Sousa	290297US2PCT	3058

22850 7590 09/23/2009
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

ROLAND, CHRISTOPHER M

ART UNIT	PAPER NUMBER
----------	--------------

2893

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

09/23/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No. 10/577,159	Applicant(s) SOUSA ET AL.	
	Examiner Christopher M. Roland	Art Unit 2893	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 August 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 20-27 and 29-39 is/are pending in the application.
- 4a) Of the above claim(s) 26, 27, 30 and 34-38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 20-25, 29, 31-33 and 39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 April 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7 August 2009 has been entered.

Status of the Claims

2. Amendment filed 7 August 2009 is acknowledged. **Claim 20** has been amended. **Claims 20-27 and 29-39** are pending. **Claims 26, 27, 30, and 34-38** remain withdrawn from consideration.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2893

3. **Claims 20-24, 29, 31-33, and 39** are rejected under 35 U.S.C. 103(a) as being unpatentable over Holmberg (US Patent 4,177,475, hereinafter Holmberg '475) in view of Petrov et al. (US Patent 4,314,256, hereinafter Petrov '256), both of record.

With respect to claim 20, Holmberg '475 teaches (FIG. 3) a phase-change memory cell substantially as claimed, comprising:

between two electrical contacts (23 and 24), a portion in a memory material with an amorphous-crystalline phase-change and vice versa, as a stack (28-30) with a central area (29) located between two passive outmost areas (28 and 30) (col. 5, ln. 7-58); and

each passive outmost area being made in a material having a melting temperature higher than that of the material of the active central area, the material of the passive outmost areas having very low solubility or zero solubility in the material of active central area, the material of the passive outmost areas having at least one chemical element in common with the material of the active central area, the passive outmost areas being made in the same material (col. 5, ln. 7-58).

Thus, Holmberg '475 is shown to teach all the features of the claim with the exception of an interface, inert or quasi-inert from a physico-chemical point of view, between the active central area and each passive outmost area.

However, Petrov '256 teaches a chalcogenide memory material having an inert separation layer of, for example, antimony thereon to prevent the interaction of other layers with said chalcogenide memory material (col. 2, ln. 60 – col. 3, ln. 17).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the passive outmost areas of Holmberg '475 of a material that forms an interface, inert or quasi-inert from a physico-chemical point of view, between the active central area and each of said passive outmost areas as taught by Petrov '256 to prevent the interaction of other layers with said active central area.

Further, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. See *In re Leshin* (125 USPQ 416).

Note that the specification contains no disclosure of either the *critical nature of the claimed passive outmost areas being made in the same material* or any unexpected results arising therefrom. Where patentability is aid to based upon a particular chosen dimension or upon another variable recited in a claim, Applicant must show that the chosen dimension is critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

With respect to claim 21, Holmberg '475 and Petrov '256 teach wherein each passive outmost area is made in a material having a thermal conductivity less than or equal to that of the material of the electrical contact which is closest to it (Holmberg '475, col. 5, ln. 7-58; Petrov '256, col. 2, ln. 60 – col. 3, ln. 17).

With respect to claim 22, Holmberg '475 and Petrov '256 teach wherein the passive outmost areas have, in a crystalline phase, an electrical resistance less than or

Art Unit: 2893

equal to that of the active central area in a crystalline phase (Holmberg '475, col. 5, ln. 7-58; Petrov '256, col. 2, ln. 60 – col. 3, ln. 17).

With respect to claim 23, Holmberg '475 and Petrov '256 teach wherein each passive outmost area is made in a material promoting a phenomenon of formation of crystalline germs in the active central area in proximity to the interface (Holmberg '475, col. 5, ln. 7-58; Petrov '256, col. 2, ln. 60 – col. 3, ln. 17).

With respect to claim 24, Holmberg '475 and Petrov '256 teach wherein each passive outmost area is made in a material substantially of the same chemical nature but with a different composition from those of the material of the active central area (Holmberg '475, col. 5, ln. 7-58; Petrov '256, col. 2, ln. 60 – col. 3, ln. 17).

With respect to claim 29, Holmberg '475 teaches further comprising an electrically insulating material (27), wherein the active central area is at least partially confined laterally by the electrically insulating material (col. 5, ln. 7-58).

With respect to claim 31, Holmberg '475 teaches wherein at least one of the passive outmost areas and the active central area coincide laterally (col. 5, ln. 7-58).

With respect to claim 32, Holmberg '475 teaches further comprising an electrically insulating material (27), wherein at least one of the passive outmost areas is bordered with the electrically insulating material (col. 5, ln. 7-58).

With respect to claim 33, Holmberg '475 and Petrov '256 teach a memory including a plurality of memory cells according to claim 20 as claimed (Holmberg '475, col. 5, ln. 7-58; Petrov '256, col. 2, ln. 60 – col. 3, ln. 17).

With respect to claim 39, Holmberg '475 and Petrov '256 teach wherein each passive outmost area is made in a material having a thermal conductivity less than or equal to that of the material of the active central area (Holmberg '475, col. 5, ln. 7-58; Petrov '256, col. 2, ln. 60 – col. 3, ln. 17).

4. **Claim 25** is rejected under 35 U.S.C. 103(a) as being unpatentable over Holmberg '475 and Petrov '256 as applied to claim 24 above, and further in view of Tanaka et al. (US Patent Application Publication 2004/0051161, hereinafter Tanaka '161) of record.

With respect to claim 25, Holmberg '475 and Petrov '256 teach the device as described in claim 24 including the additional limitation wherein the material of each passive outmost area being antimony or antimony mixed with tellurium with a percentage ranging up to about 2%, these percentages being atomic percentages (Petrov '256, col. 2, ln. 60 – col. 3, ln. 17).

Thus, Holmberg '475 and Petrov '256 are shown to teach all the features of the claim with the exception of wherein the material of the active central area includes between about 16% and 30% of tellurium and between about 84% and 70% of antimony.

However, Tanaka '161 teaches a chalcogenide material (12) comprising between about 16% and 30% of tellurium and between about 84% and 70% of antimony ([0046])

Art Unit: 2893

as a recording layer in a non-volatile memory that can increase the possible number of data rewriting cycles while lowering power consumption ([0008]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the active central area of Holmberg '475 and Petrov '256 comprising between about 16% and 30% of tellurium and between about 84% and 70% of antimony as taught by Tanaka '161 as a recording layer in a non-volatile memory that can increase the possible number of data rewriting cycles while lowering power consumption.

Further, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. See *In re Leshin* (125 USPQ 416).

Within purview of one having ordinary skill in the art, it would have been obvious to determine the optimum concentrations of tellurium and antimony. See *In re Aller*, *Lacey*, and *Hall* (10 USPQ 233-237), "It is not inventive to discover optimum or workable ranges by routine."

Response to Arguments

5. Applicant's amendments to claim 20 are sufficient to overcome the objection to claim 20 made in the final rejection filed 9 February 2009. The objection to claim 20 has been withdrawn.

6. Applicant's arguments filed 7 August 2009 have been fully considered but they are not persuasive.

Applicant argues (remarks, p. 9) that because Holmberg 475's layers (28 and 30) contain different concentrations of germanium, Holmberg '475 fails to teach or suggest the limitation of claim 20, "the passive outmost areas being made in the same material." Examiner respectfully disagrees.

Holmberg '475 teaches (FIG. 3) the passive outmost areas (28 and 30) being made in the same material (col. 5, ln. 7-58). Both passive outmost areas are made in the same material: germanium telluride (GeTe). Though the germanium concentration may differ between passive outmost area (28) and passive outmost area (30), Examiner maintains that the two passive outmost areas are made in the same material, namely germanium telluride.

Further, Examiner notes that Applicant's specification discloses, "It is preferable that both passive outmost areas be made in a same material, of course, this is not mandatory, other selections are possible" (p. 15, ln. 10-13). Note that the specification contains no disclosure of either the *critical nature of the claimed passive outmost areas being made in the same material* or any unexpected results arising therefrom. Where patentability is aid to based upon a particular chosen dimension or upon another variable recited in a claim, Applicant must show that the chosen dimension is critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher M. Roland whose telephone number is 571-270-1271. The examiner can normally be reached on Monday-Friday, 8:00AM-5:00PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Davienne Monbleau can be reached on 571-272-1945. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/C. M. R./
Examiner, Art Unit 2893

/Davienne Monbleau/
Supervisory Patent Examiner, Art Unit 2893